What is claimed is:

1. A method for generating a terrain elevation map in proximity to a vehicle, the method comprising:

retrieving terrain elevation data based on aircraft position information generated
5   by a navigation component; and

generating a Cartesian coordinate-referenced terrain elevation map based on the

retrieved terrain elevation data and the aircraft position information received

from the navigation component.

2. The method of Claim 1, further comprising saving the generated terrain elevation
10   map in a database.

3. The method of Claim 1, further comprising:

sending the generated terrain elevation map to a display processor; and

generating a map image for display based on the sent terrain elevation map.

4. The method of Claim 1, further comprising sending the terrain elevation map to the
15   navigation component, wherein the navigation component comprises a ground proximity

warning component for generating one or more of a ground proximity caution or warning

based on the received terrain elevation map.

5. The method of Claim 1, further comprising:

sending the terrain elevation map to the navigation component;
20   generating navigation signals at the navigation component based on the received

terrain elevation map; and

sending the generated navigation signals to one or more navigation units for

presentation.

6. The method of Claim 1, further comprising sending the terrain elevation map to a radar system.

7. The method of Claim 6, further comprising generating a volumetric buffer based on the terrain elevation map and radar signals generated by the radar system.

5   8. The method of Claim 1, wherein generating the terrain elevation map comprises:

> initializing the terrain elevation map;

> updating the initialized terrain elevation map; and

> updating a rotation angle of the terrain elevation map.

9. The method of Claim 8, wherein initializing the terrain elevation map comprises:

10   setting a stabilized transform matrix equal to a north referenced transform matrix;

> setting a rotation angle between a north referenced frame and a stabilized frame equal to zero;

> calculating each position of the cells of an earth centered earth fixed referenced frame;

15   calculating latitude and longitude for each of the cells in the earth centered earth fixed referenced frame; and

> mapping terrain elevation data into a terrain elevation map referenced to the stabilized frame based on the calculated latitude and longitude and the stabilized transform matrix.

20   10. The method of Claim 9, wherein updating the terrain elevation map comprises:

> determining if the vehicle has moved a distance at least one of greater than or equal to a threshold amount; and

adding at least one other row or column of terrain elevation data to the terrain elevation map if the vehicle was determined to move at least one of greater than or equal to the threshold amount.

11. The method of Claim 9, wherein updating the rotation angle comprises:

5   determining incremental displacement values of the vehicle; and

updating the rotation angle between the stabilized frame and the north referenced frame based on the determined incremental displacement values.

12. The method of Claim 11, wherein updating the rotation angle comprises generating a stabilized transform matrix based on the incremental displacement values.

10   13. A computer program product for generating a terrain elevation map relative to a vehicle, the product comprising:

a component for retrieving terrain elevation data based on aircraft position information generated by a navigation component; and

a component for generating a Cartesian coordinate-referenced terrain elevation

15   map based on the retrieved terrain elevation data and the aircraft position information received from the navigation component.

14. The product of Claim 13, further comprising a component for saving the generated terrain elevation map in a database.

15. The product of Claim 13, further comprising:

20   a component for sending the generated terrain elevation map to a display processor; and

a component for generating a map image for display based on the sent terrain elevation map.

16. The product of Claim 13, further comprising a component for sending the terrain elevation map to the navigation component, wherein the navigation component comprises a ground proximity warning component for generating one or more of a ground proximity caution or warning based on the received terrain elevation map.

17. The product of Claim 13, further comprising:

a component for sending the terrain elevation map to the navigation component;

a component for generating navigation signals at the navigation component based on the received terrain elevation map; and

a component for sending the generated navigation signals to one or more navigation units for presentation.

18. The product of Claim 13, further comprising a component for sending the terrain elevation map to a radar system.

19. The product of Claim 18, further comprising a component for generating a volumetric buffer based on the terrain elevation map and radar signals generated by the radar system.

20. The product of Claim 13, wherein the component for generating the terrain elevation map comprises:

a component for initializing the terrain elevation map;

a component for updating the initialized terrain elevation map; and

a component for updating a rotation angle of the terrain elevation map.

21. The product of Claim 20, wherein the component for initializing the terrain elevation map comprises:

a component for setting a stabilized transform matrix equal to a north referenced transform matrix;

a component for setting a rotation angle between a north referenced frame and a stabilized frame equal to zero;

a component for calculating each position of the cells of a centered earth fixed referenced frame;

a component for calculating latitude and longitude for each of the cells in the earth centered earth fixed referenced frame; and

a component for mapping terrain elevation data into a terrain elevation map referenced to the stabilized frame based on the calculated latitude and longitude and the stabilized transform matrix.

22. The product of Claim 21, wherein the component for updating the terrain elevation map comprises:

a component for determining if the vehicle has moved a distance greater than a threshold amount; and

a component for adding at least one other row or column of terrain elevation data to the terrain elevation map if the vehicle was determined to move at least one of greater than or equal to the threshold amount.

23. The product of Claim 21, wherein the component for updating the rotation angle comprises:

a component for determining incremental displacement values of the vehicle; and

a component for updating the rotation angle between the stabilized frame and the north referenced frame based on the determined incremental displacement values.

24. The product of Claim 23, wherein a component for updating the rotation angle comprises a component for generating a stabilized transform matrix based on the incremental displacement values.

25. A system for generating a terrain elevation map relative to a vehicle, the system comprising:

memory for storing terrain elevation data;

a navigation component for generating aircraft position information; and

a processor in communication with the memory and the navigation component, the processor comprising:

a component for retrieving terrain elevation data from the memory based on the generated aircraft position information; and

a component for generating a Cartesian coordinate-referenced terrain elevation map based on the retrieved terrain elevation data and the aircraft position information.

26. The system of Claim 25, wherein the processor further comprises a component for saving the generated terrain elevation map in the memory.

27. The system of Claim 25, further comprising:

a display processor in communication with the processor, the display processor generates a map image.

28. The system of Claim 25, wherein the navigation component comprises a ground proximity warning component for generating one or more of a ground proximity caution or warning based on the received terrain elevation map.

29. The system of Claim 25, wherein the navigation component comprises:

a component for generating navigation signals based on the received terrain elevation map, and

a component for presenting at least a portion of the generated navigation signals.

30. The system of Claim 25, further comprising a radar system for generating a volumetric buffer based on the terrain elevation map and radar signals generated by the radar system.

31. The system of Claim 25, wherein the component for generating the terrain elevation map comprises:

a component for initializing the terrain elevation map;

a component for updating the initialized terrain elevation map; and

a component for updating a rotation angle of the terrain elevation map.

32. The system of Claim 31, wherein the component for initializing the terrain elevation map comprises:

a component for setting a stabilized transform matrix equal to a north referenced transform matrix;

a component for setting a rotation angle between a north referenced frame and a stabilized frame equal to zero;

a component for calculating each position of the cells of a centered earth fixed referenced frame;

a component for calculating latitude and longitude for each of the cells in the earth centered earth fixed referenced frame; and

a component for mapping terrain elevation data into a terrain elevation map referenced to the stabilized frame based on the calculated latitude and longitude and the stabilized transform matrix.

33. The system of Claim 32, wherein the component for updating the terrain elevation map comprises:

> a component for determining if the vehicle has moved a distance greater than a threshold amount; and

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> a component for adding at least one other row or column of terrain elevation data to the terrain elevation map if the vehicle was determined to move at least one of greater than or equal to the threshold amount.

34. The system of Claim 32, wherein the component for updating the rotation angle comprises:

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> a component for determining incremental displacement values of the vehicle; and

> a component for updating the rotation angle between the stabilized frame and the north referenced frame based on the determined incremental displacement values.

35. The system of Claim 34, wherein a component for updating the rotation angle

15 comprises a component for generating a stabilized transform matrix based on the incremental displacement values.